

SNOW STOP**CROSS-REFERENCE**

This claims benefit under 35 USC 119(e) of provisional patent application No. 60/241,627 filed on October 19, 2000 A.D. The complete specification of that U.S. application is incorporated herein by reference.

BACKGROUND TO THE INVENTION**I. Field and Purview:**

In general, the present invention concerns a snow stop, useful for impeding a sudden avalanche of snow on a pitched roof. In particular, it especially concerns a snow stop that may be affixed to the roof with adhesive. It can have a series of grooves and/or vent holes for assisting in curing the adhesive.

II. Art with Problems:

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A1* > Various snow guards are known. See, e.g., Clark, US D30788; Zaleski, US D254051; Cline et al., US D351989; Cline, US D364338; Lee et al., US D364556; Cline, US D372421; Cline, US D418403; Mullane, US D419863; Zaleski, US 3296750; Cline et al., US 5282340; Zaleski, US 5343659; Kwiatkowski et al., US 5371979; Smeja et al., US 5471799; Cline, US 5522185; Kwiatkowski et al., US 5570557; Kwiatkowski, US 5655334; Lee, US 5664374; and Smeja et al., 5901507. See also, Berger Building Products Corp., "Your One Stop Snow Guard Shop," electronic catalog, 1997; M.J. Mullane Co., "Cast Snow & Ice Guards," brochure, and "Snow Guards," brochure (comparing, www.bronzeguard.com); and Snowjax, Inc.,

Metal Construction News, Jan. 1993 ad: "A Space Age Snowguard for Metal Roof Surfaces." Among snow guards, moreover, some are fastened to the roof by adhesives, and some of these are made of plastic. A problem with adhesive-attachment of snow guards to roofs is lack of strength, which can result in failure of the guard to adhere to the roof, especially under a load of snow or ice.

It would be desirable to ameliorate or overcome such vexing problems in the art.

SUMMARY OF THE INVENTION

In general, after conducting dedicated research into the problems in the art, especially as can relate to attachment of snow guards with adhesives, and discovering, among other things, that incomplete adhesive cure was a cause of many failures, the same at times engendered by an inability for adhesive solvents to appropriately escape the adhesive matrix, the present invention was conceived and developed. The invention provides a snow stop comprising a base member, and a snow-restraining member. In one particular embodiment, the snow stop has a series of holes for ventilation of adhesive as well as, as a further option, for insertion of fasteners such as nails, screws and/or staples, to fasten the device to a roof. Slots (grooves) to the holes or boundary of the snow stop may be provided. The holes and grooves also can provide for increased physical bonding with the adhesive and hence, roof. In another particular embodiment, the base is

round and the snow restraining member is included in intersecting upstanding members, which, say, may be at a predetermined angle to each other, for example, at about ninety degrees. Other embodiments of the snow stop of the invention are extant.

Significantly, by the invention, vexing problems in the art are ameliorated if not overcome. The snow stop of the invention can engender better solvent evaporation from the adhesive under the base of the snow stop, with which the snow stop can be attached to the roof. Firmer attachment of the snow stop, and a more reliable performance and longer life, can thus be provided. In addition, the embodiment with the round base, particularly with generally symmetrical, upstanding members at right angles to one another, can be installed readily, and occasional misplacement on the roof is less noticeable.

Numerous further advantages attend the invention.

DRAWINGS OF INVENTION WITH ASSOCIATED DESCRIPTION

The appended drawings form part of the present specification. With respect to the drawings, which are not necessarily drawn to scale, the following is briefly noted:

FIG. 1 is a top view of a snow stop of the present invention, which is made of a light-transmissive material, for example, of a polycarbonate plastic monolithically molded to form the device, its base having holes and a slotted, rough surfaced bottom.

FIG. 2 is a bottom view of the snow stop of FIG. 1.

FIG. 3 is a front view of the snow stop of FIGS. 1 & 2.

FIG. 4 is a left side view of the snow stop of FIGS. 1-3, its right side being in essence a mirror image thereof.

FIG. 5 is a rear view of the snow stop of FIGS. 1-4.

FIG. 6 is a top, left, rear perspective view of the snow stop of FIGS. 1-5, attached to a roof by a suitable adhesive.

FIG. 7 is a detail of slots in the base of the snow stop of FIGS. 1-6. Note also, FIGS. 11-18.

FIG. 8 is a bottom view of another embodiment of a snow stop of the invention, which is made of a light-transmissive material, for example, of a polycarbonate plastic monolithically molded to form the device, its base having holes but otherwise with a generally smooth bottom, and its shape otherwise akin to the snow stop of FIGS. 1-7.

FIG. 9 is a perspective view of another embodiment of a snow stop of the invention, which is made of a light-transmissive material, for example, of a polycarbonate plastic monolithically molded to form the device, its base being without holes and with a generally smooth bottom, and its shapes otherwise akin to the snow stops of FIGS. 1-8.

FIG. 10 is a perspective view of another embodiment of a snow stop of the invention, which is made of an opaque material, for example, a polyvinyl chloride plastic, opacified if necessary, monolithically molded to form the device, its base having holes, and its shapes otherwise akin to the snow stops of FIGS. 1-9.

FIG. 11 is an embodiment of a snow stop of the invention akin

to the snow stop of FIGS. 1-7, but having a strap-attaching slot, showing preferred dimensions given in inches. Compare, FIG. 1.

FIG. 12 is a rear view of the snow stop of FIG. 11. Compare, FIG. 5.

FIG. 13 is a left side view of the snow stop of FIGS. 11 & 12, its right side being in essence a mirror image thereof. Compare, FIG. 4.

FIG. 14 is a detailed view of slots in the base of the snow stop of FIGS. 11-13. Note, FIG. 15, circle B. Compare, FIG. 7.

FIG. 15 is a cross-sectional view of bottom slots in the base of the snow stop of FIGS. 11-14, taken along A-A (FIG. 16).

FIG. 16 is a bottom view of the snow stop of FIGS. 11-15. Compare, FIG. 2.

FIG. 17 is a top, left, rear perspective view of the snow stop of FIGS. 11-16. Compare, FIG. 6.

FIG. 18 is a bottom, right, front perspective view of the snow stop of FIGS. 11-17.

FIG. 19 is a top view of another embodiment of the invention, having two support members for its snow restraining member, but otherwise generally akin to the snow stop depicted in detail in FIGS. 11-18, with dimensions given in inches. Compare, FIG. 11.

FIG. 20 is a rear view of the snow stop of FIG. 19. Compare, FIG. 12.

FIG. 21 is a left side view of the snow stop of FIGS. 19 & 20, its right side being in essence a mirror image thereof.

Compare, FIG. 13.

FIG. 22 is a detailed view of slots in the base of the snow stop of FIGS. 19-21. Note, FIG. 23, circle B. Compare, FIG. 14.

FIG. 23 is a cross-sectional view of bottom slots in the base of the snow stop of FIGS. 19-22 taken along A-A (FIG. 24).

Compare, FIG. 15.

FIG. 24 is a bottom view of the snow stop of FIGS. 19-23. Compare, FIG. 16.

FIG. 25 is a top, left, rear perspective view of the snow stop of FIGS. 19-24. Compare, FIG. 17.

FIG. 26 is a bottom, right, front perspective view of the snow stop of FIGS. 19-25. Compare, FIG. 18.

FIG. 27 is a top view of another embodiment of the present invention, having a round base and ventilation holes therein.

FIG. 28 is a side, cross-sectional view of an upstanding member of the snow stop of FIG. 27 taken along A-A (FIG. 27).

FIG. 29 is a side view of the snow stop of FIGS. 27 & 28, shown at a 45-degree angle in relation to its upstanding members.

FIG. 30 is a side, cross-sectional view of part of the base with slots of the snow stop of FIGS. 27-29, circle B in FIG. 28.

FIG. 31 is a top, perspective view of the snow stop of FIGS. 27-30.

FIG. 32 is a bottom view of the snow stop of FIGS. 27-31.

FIG. 33 is a bottom, perspective view of the snow stop of FIGS. 27-32.

FURTHER DETAIL ILLUSTRATIVE OF THE INVENTION

The invention can be further understood by the present detail, which may be read in view of the drawings. Such is to be taken in an illustrative, and not necessarily limiting, sense.

Sub 31 With respect to the drawings, snow stop 100 includes base member 10 and, upstanding from the base 10, snow-restraining member 20 (FIGS. 1-33). Support 21 may help brace the member 20 to resist advancing snow and ice (FIGS. 1-26 and 27-33) and/or itself restrain snow or ice, particularly when the stop 100 is configured for choice in orientation among several (FIGS. 27-33). Snow/ice/water relief opening 22 may be in the snow-restraining member 20 and/or brace 21. Holes 30 pass through the base 10 and can be connected with grooves or slots 31. The holes 30 may be evenly spaced to allow solvents in the adhesive to dissipate quickly, and become, as it were, "glue-rivets," when the adhesive keys into the holes, for a more secure application. A type of cross-hatch configuration with the grooves 31 also helps adhesive grip by increasing surface area and texture, and provides for a faster solvent escape, and hence, a faster and more complete adhesive curing. A rough or textured finish may be applied to the bottom surface of the base 10, holes 30 and/or grooves 31. This may decrease surface tension in order to increase adhesive holding power. Slot 32 may be provided for insertion of a securing hook or nailing strap such as made of metal (not illustrated) or may be absent, say, with grooves 31 in their

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place (FIGS. 1-6, 24 and 26), for a more extensive adhesive bond. In light of the adhesives commonly employed in the art, the snow stop 100 is particularly compatible with all non-copper metal roof systems. Its durable, rugged construction and configuration is structurally stable, with shapes and dimensions that can withstand severe loading. Thus, a preferred snow-restraining member 20 to base 10 ratio is 2:1, or thereabouts, for resisting peel and shear forces, and helping prevent breakage under load.

Any suitable material may be employed to make the snow stop of the invention; it may be made opaque or light-transmissive, in whole or in part: opaque: suitable metal, wood, ceramic, glass or plastic, for example, polyvinyl chloride (PVC), appropriately opacified if necessary; light-transmissive: suitable glass or plastic, for example, polycarbonate. The light-transmissive devices of the invention may be translucent or transparent, for example, substantially if not wholly transparent. The snow stop device of the present invention may be white, black, colorless (if light-transmissive) or of various color. The device may be made in component parts or monolithically, and it may be wholly or partly opaque or light-transmissive. Desirably, the device is wholly of one property as regards light and color, for example, wholly opaque white or wholly transparent blue. Exemplary plastic materials for use in making the snow stop of the invention include Lexan or Geon colored plastics. The plastic may be UV-stabilized. For example, Lexan plastic containing

models can be transparent, and colorless or colored, with UV-light stabilizers added; Geon plastic containing models can be opaque, and white, black, or colored. Molding may be employed.

Shapes and dimensions of the snow stop of the invention may vary. Thus, in addition to shapes seen in the drawings and such dimensions as in FIGS. 11-33, any other suitable shape or size of the device and its components may be employed. Grooves and/or holes may be the same or differing size(s) and/or shape(s). For example, round holes may be present, all of 0.375-inch diameters.

Testing of models such as that found in FIGS. 1-6 or 11-18 and as described hereinabove, with employment of the Geon plastic molding material, yielded the following: ASTM D792 specific gravity, 1.40; ASTM D2240 durometer D hardness, 80 pts; ASTM D638 tensile strength @2"/min., 7000 psi, tensile modulus @ 2"/min., 405000 psi, and ultimate elongation, 44%; ASTM D790 flexural strength, 11000 psi, and flexural modulus, 385000 psi; and ASTM D256 notched Izod impact, 73 F (23 C), 1/8" bars, 10 ft-lb/in.

CONCLUSION

The present invention is thus provided. Various features, parts, subcombinations and combinations can be employed with or without reference to other features, parts, subcombinations or combinations in the practice of the invention, and numerous and sundry adaptations and modifications can be effected within its spirit, the literal claim scope of which is particularly pointed out as follows: